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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/622,421  
Filing Date: July 18, 2003  
Appellant(s): MERKEL ET AL.

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**SEP 20 2007**  
**GROUP 1700**

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Andrew J. Anderson  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed June 29, 2007 appealing from the Office action mailed September 26, 2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The amendment after final rejection filed on January 23, 2007 has been entered.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,919,109	NAKANO et al.	7-2005
6,495,242	TSUCHIYA et al.	12-2002
6,689,433	NIU et al.	2-2004

EP 1,080,934 SISMONDI et al. 8-2000

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1, 4, 6-8, 11, 12, 22-29 and 34 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano et al. (6,919,109) taken alone or further in view of Tsuchiya et al. (6,495,242).

Nakano et al. disclose a porous image recording element comprising a support and an image receiving layer which may comprise colloidal silica, hydrophilic binder (e.g. polyvinyl alcohol), and fluorosurfactant (see col. 6, lines 37-47, col. 12, lines 28-44, col. 18, line 32-36, col. 20, lines 10-14). Binder is present at 9 to 40% by mass of the coloring agent accepting layer (col. 12, lines 64-67). The reference is concerned with both gloss and ink absorbing speed and has measurements within the instantly claimed ranges (see col. 29, lines 30-45 and Table 2).

Nakano et al. further disclose that a water dispersible latex may be included in amounts of .1 to 30% by mass (see col. 8, lines 19-21, col. 11, lines 16-19). The particles have a preferred average diameter of 50 nm or less. The image receiving layer may be applied at pH of 8 or higher and the pH of the coloring agent accepting layer is adjusted to be from pH 3 to 8 (see col. 15, lines 4-21 and col. 16, lines 45-58). Cross-linking agent including boron compounds and glyoxal may be present (see col. 14, lines 6-41). The amount of cross-linking agent is 1 to 50% by mass (col. 15, lines 22-24). The surfactant is present in amounts of .001 to 2.0% (see col. 19, lines 44-46). The support may be paper or plastic (see col. 20, lines 11-17).

Determination of particle size of inorganic pigment within conventional ranges would have been obvious to one of ordinary skill in the art. It would have been obvious to include silica with a narrow variation in size so that pores formed between particles are uniform. Determination of polyvinyl alcohol from those conventionally used in the art, including determination of degree of hydrolysis and viscosity (relevant to the coating properties of the coating composition for the layer) would have been obvious to one of ordinary skill in this art. Determination of a fluorosurfactant from those known and used in the art would also have been obvious. It is noted that fluorosurfactants such as Lodyne ® are known in the art as taught for use in an ink jet recording material by Niu et al. (6,689,433).

Determination of coloring agent accepting layer coating weight so that the medium has sufficient ink absorption would have been obvious to one of ordinary skill in the art in light of the interest of the reference in ink absorbing speed as set forth above.

Nakano et al. disclose colloidal silica particles with an average diameter of 50 nm or less as preferable particles to achieve the goals of the reference (i.e. rapid drying and gloss). Since this disclosure is of a preferred range, it would suggest to one of ordinary skill in the art that it is acceptable to include particles that fall within a broader size range when other conventional properties are to be maintained within desired ranges. It would have been obvious to one of ordinary skill in the art to optimize the desired properties (e.g. drying time and gloss) taught by the prior art through determination of a commercially available colloidal silica. It is noted that in the response of November 4, 2005, page 9, appellants indicated that "counterions are inherently present in

commercial anionic colloidal silica" and that US Patent 4,915,870 describes potassium stabilized silica sols. Appellants' specification indicates counterions of commercial silica in Table VII.

The examiner has considered appellants' showings with respect to particle size and size range and has found them unpersuasive. Because appellants' showings change both variables at once, the criticality of the end points of ranges for either value cannot be determined. In addition, both of these values are art recognized properties that one of ordinary skill in the art would control to optimize well recognized properties such as gloss and dry time. Therefore, appellants' results are not unexpected.

To support this assertion of the state of the art, the examiner relies upon Tsuchiya et al. The secondary reference discloses an ink jet recording sheet having a void layer containing fine inorganic particles having a dispersion degree of no more than two. The reference is particularly concerned with gloss (see the abstract) and also discusses the importance of other properties including rapid ink absorption without running or blotting (col. 1, lines 18-25). The reference discloses colloidal silica as a preferred inorganic particle and a particle diameter of no more than 100 nm (col. 5, lines 4-50). The dispersion degree taught by the reference is the ratio of standard deviation to average particle diameter. Controlling this value to no more than two clearly demonstrates a preference in the prior art for uniform particle sizes. With these teachings concerning particle size and particle size range, it would have been obvious to one of ordinary skill in the art to select particles as taught by the secondary reference

for use in the medium of the primary reference in order to optimize the properties disclosed by the secondary reference.

2. Claims 1, 3-8, 11, 12, and 22-34 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano et al. (6,919,109) in view of Tsuchiya et al. (6,495,242) and further in view of Niu et al. (6,689,433) for reasons set forth above and for the reasons provided below.

Niu et al. teach a print media comprising a support having at least one ink receiving layer thereon. The ink receiving layer includes a binder blend and one or more pigments (see the abstract). The reference discusses the importance of drying times at col. 1, lines 20-24 and of gloss at col. 1, line 67 to col. 2, line 8, and specular gloss at col. 29, lines 46-56.

The support may be porous or non-porous (see col. 8, line 34-57). An absorbing layer may be present between the support and the ink receiving layer (see col. 9, lines 4-28). An ink receiving layer 30 is applied to the support (see col. 10, line 63 to col. 11, line 2). The layer includes multiple binders including latex binders and polyvinyl alcohol (see col. 15, line 49-col. 16, line 38, col. 17, lines 40-58). Polyvinyl alcohol may be present and have a degree of hydrolysis within the range instantly claimed (see col. 18, line 18 to col. 19, line 34). Colloidal silica may be included. It does not have to be treated and since silica is inherently anionic, the silica will be anionic. While no limiting size range is set forth, a size range of 300 to 400 nm is disclosed (see col. 21, lines 36-65).

Fluorosurfactants such as Lodyne ® are included as well, in amounts of .02 to 2% by weight (see col. 22, line 45 to col. 23, line 14). pH modifier may be present to control pH within desired values (see col. 23, line 55 to col. 24, line 5). Hardeners, including vinyl sulfones may be present (see col. 24, line 6-21). Coating weights recited by the reference are non-limiting and are within the range of 5-13 g/m<sup>2</sup> (col. 26, line 28-34).

As taught by Niu et al., it is known in the art to include additional layers which may be the same or different from the originally described coating layer. It is well within the scope of one of ordinary skill in the art to determine the need to include additional layers in order to produce a medium with sufficient ink absorption capability for the intended function. See col. 27, line 19 to col. 29 , line 11 of the Niu et al. reference where such layers including coating thickness are suggested.

3. Claims 1, 4, 6-8, 11, 12 and 22-34 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuchiya et al. (6,495,242).

It is noted that the rejection of claim 33 over Tsuchiya et al. alone has been withdrawn.

The reference discloses an ink jet recording sheet having a void layer containing fine inorganic particles having a dispersion degree of no more than 2. The reference is particularly concerned with gloss (see the abstract) and also discusses the importance of other properties including rapid ink absorption without running or blotting (col. 1, lines 18-25). The reference discloses colloidal silica as a preferred inorganic particle with a particle diameter of no more than 100 nm (col. 5, lines 4-50). The dispersion degree

taught by the reference is the ratio of standard deviation to average particle diameter. Controlling this value to no more than two clearly demonstrates a preference in the prior art for uniform particle sizes.

The reference also discloses both porous and non-porous supports (col. 3, lines 13-42). The 60 degree specular gloss is disclosed as preferably 20 to 60 (col. 5, lines 1-3). The binder may be polyvinyl alcohol. (col. 5, lines 51-57). The binder may be cross-linked with a boric acid (col. 8, lines 51-65). The ratio of particles to binder is between 3 and 10 (col. 6, lines 23-31). This should result in percentages of binder that fall within the instantly claimed range. Gloss may be increased through use of latex particles (col. 6, line 66 to col. 7, line 24). Glass transition temperature of the latex within the instantly claimed range would have been inherent or obvious because at a higher glass transition temperature, the particles would be subject to deformation and therefore would be unable to perform their intended function in the recording element. There may be a swelling layer between the support and the void layer (col. 8, lines 18-20). The void layer may contain a fluorine series surface active agent to improve lubricating properties (col. 9, lines 13-34). While the amount is not set forth, it would have been obvious to one of ordinary skill in the art to determine a quantity to perform this function without having a deleterious effect on other properties of the layer. A plurality of void layers may also be present (col. 9, lines 33-34). While the total dry coverage of the layers is not set forth, the examples provide enough information for one of ordinary skill in the art to determine coating weights that achieve the objects of the reference.

Selection of a polyvinyl alcohol from those conventionally used in the art, including determination of degree of hydrolysis and viscosity (relevant to the coating properties of the coating composition for the layer) would have been obvious to one of ordinary skill in this art. Selection of a fluorosurfactant from those known and used in the art would also have been obvious. It is noted that fluorosurfactants such as Lodyne ® are taught as being conventional in an ink jet recording material by Niu et al. (6,689,433).

4. Claims 1 and 33 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuchiya et al. (6,495,242) in view of Nakano et al. (6,919,109). Nakano et al. disclose a process of cross-linking and coating the image receiving layer preferably at pH of 8 or higher (see col. 14, line 61 to col. 15, lines 4-21). It would have been obvious to use this disclosed technique to facilitate coating and curing of the layers of Tsuchiya et al. which have the same issue of coating a layer containing a cross-linking agent therein.

#### **(10) Response to Argument**

1. Appellants' first argue that the colloidal silica of Nakano et al. is cationic because it is mixed with a cationic polymer. At page 3, lines 4- 5 of their brief, they even indicate that the silica of Nakano et al. is "acidic cationic surface-modified particles." It is true that in this art for silica to be considered cationic by one of ordinary skill in the art that it must be surface modified. It is not true that cationic surface modified silica is taught or suggested by Nakano et al. Untreated silica is anionic and there is nothing to indicate that the silica of Nakano et al. has been surface modified.

As an example of how this is typically represented in the art, the examiner cites Sismondi et al. (EP 1,080,934). This patent is to an ink-jet printing receiver sheet and in describing inorganic particles to be included as fillers, the reference lists both "silica (colloidal silica)" and "a surface-processed cation colloidal silica" indicating that the surface of this silica has been modified to make it cationic [0031]. Mixed with a cationic polymer (as is done in Nakano et al.) and surface modified (as taught by Sismondi et al.) are two very different things. The silica of Nakano et al. would be considered anionic by one of ordinary skill in the art since untreated silica is anionic. The remainder of appellants' discussion of this issue concerning the acidity of the coating solutions of the Nakano et al. is irrelevant to all claims but claim 33, since none of the other claims are directed to pH of the coated layer.

Appellants' next argument concerns the combination of ranges for "median diameter" and particles size distribution of the silica. Nakano et al. disclose a preferred "average primary particle diameter" of 50 nm or less (col. 4, lines 58-60). First, a direct comparison cannot be made between the value of the reference and that of appellants. One is a median value and the other an average. Second, it is obvious to optimize particle size and particle size distribution. The fine particles form a porous structure that creates ink absorbency in the ink accepting layer (see col. 6, lines 12-14 of Nakano et al.). Unless the particles are themselves porous, it is the interstices between the particles that create porosity. The size of the particles and the particle size distribution determine the size of the pores and the pore size distribution. The particle size distribution and the size of the pores are both well-known properties in the art.

Consequently, subclasses 428/32.32 for “Pore size or volume” and 428/32.25 for “Particle size distribution” in the Manual of Classification exist to capture these features of ink jet recording media. The reason the examiner alleged that the art suggested a broader range of possible values for the particle size is that the range disclosed is a preferred range which indicates that the patentees were aware that a broader range of values may be useful. The reference may suggest these values to obtain gloss and rapid drying, but the reference suggests other properties are also important, for example print density and suitability for coating (see col. 1, lines 19-23 and col. 2, lines 39-43 of Nakano et al.). Therefore, one of ordinary skill in the art would have read the disclosure of Nakano et al. as suggesting a range of particle size extending beyond 50 nm.

Appellants argue that they have demonstrated criticality of their size range, referring to Table VII on page 30 and Table VIII on page 31 of their specification. These showings cannot be fully evaluated because appellants have failed to vary only one parameter while holding all others constant. With both the median particle size and the particle size range changing, criticality cannot be determined. In addition, the particle size range of Table VII is not even a value recited by the claims. At the very least, comparative data should have been expressed in the precise terms of the claim parameters to which they pertain.

It is noted that Nakano et al. disclose pore diameter ranges at col. 25, lines 23-29. The result of varying the values of median particle size and particle size range will be that the pore size distribution chart changes in some way, but it is unclear how it will change or if it will change differently based upon selection of commercially available

particles even if the instantly claimed values of the particles are the same or similar. It is unclear if appellants' results are due to the claimed values or due to the effects of other factors that these two values don't account for. Not all commercially available silicas will have particle sizes that fall within a conventional bell curve and resulting pore size distributions may have a single peak or multiple peaks. Without more information, there is real uncertainty whether or not these values are meaningful. As an example, Element 18 is within and Element 20 is out of the instantly claimed range for median particle size. These elements have significantly different median particle sizes. Yet the results in Table VIII are almost the same with Element 20 coming out slightly better even though it is outside of the instantly claimed range. Consequently, there is no way to attribute the results to the claimed values. Instead this is mere optimization by testing commercially available silicas.

With respect to Tsuchiya et al., appellants repeat their argument concerning mixture of silica with a cationic polymer. The claims do not preclude mixture with a cationic polymer, but merely recite that the silica is anionic. There is nothing in Tsuchiya et al. to suggest that the silica is surface modified by mixing with a cationic pigment. As stated earlier, one of ordinary skill in the art would consider silica anionic unless it is stated to be surface modified to render it cationic. Contrary to appellants' arguments, they do not claim an "anionic colloidal silica particle dispersion" but merely anionic colloidal silica particles.

2. Niu et al. has been relied upon in combination with the other references to enhance teachings with respect to the state of the art concerning the obviousness of

determining materials and parameters such as conventionally known fluorosurfactants and polyvinyl alcohols for inclusion in ink receiving layers as well as conventional coating weights for such layers. Niu et al. has also been cited for it's teaching of controlling pH of the composition (col. 23, line 55 to col. 24, line 5). Even though the preferred pH range of Niu et al. is lower than that of instant claim 33, the reference acknowledges that controlling pH of the coating is well known in the art. At col. 16, lines 45-48, Nakano et al. disclose that the pH of the coloring agent accepting layer is adjusted to be from pH 3 to 8. The teachings of the reference are not limited to the specific examples. The surface pH range of the primary reference overlaps with that of instant claim 33.

3. The colloidal silica of Tsuchiya et al. and appellants' showings in the specification have already been discussed. Rejection of claim 33 over Tsuchiya et al. alone has been withdrawn.

4. With respect to the combination of Tsuchiya et al. and Nakano et al., it is noted that the pH values appellants are reciting from Tsuchiya et al. do not represent the "surface pH" of the image receiving layer moistened with water, which is what is recited by claim 33. Without the ability to run experiments, the examiner is unable to determine the relationship of these values. Nakano et al. teach carrying out cross-linking of the binder under basic conditions by addition of a basic solution of pH 8 or higher (top of column 15) but disclose adjusting the surface pH of the coloring agent accepting layer to pH 3 to 8 (col. 16, lines 45-48). Since Tsuchiya et al. is silent with respect to the surface pH of the coloring agent accepting layer, it would have been

obvious to one of ordinary skill in the art to adjust the surface pH in order to avoid yellowing discoloration as taught by Nakano et al.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Pamela R. Schwartz, Primary Examiner

Conferees:



Milton Cano, SPE, Art Unit 1774



Romulo Delmendo, Appeals Conferee, TC 1700